As a purely empiric measure, one wonders, when 80 per cent. of the cases appear so monotonously with a definite time relation to the first course, whether anything could be done by reorganizing the first course of treatment, so that the patient could be kept more continuously under arsenic the whole of the first six months of his treatment.

Such a scheme of treatment could easily enough be arranged without increasing the total amount of arsenic, which is very variously considered to be essential, for instance, by heightening the individual dose up to 0.75 or 0.9 gr. and lengthening the interval of injections to two or three weeks.

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APPENDICOSTOMY.

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IN the *British Medical Journal* of 1894 (Vol. II, p. 1112) there occurs an account of a meeting of the Medical Society of London, at which Mr. Goodsall showed a man who had come into hospital for intestinal obstruction, caused by cancer of the rectum. At operation he found the sigmoid could not be brought up to the surface, and the abdomen was closed, but on account of increasing obstruction he operated again several days later. He cut down upon the cæcum, and after some manipulation he managed to get it to the surface and opened it immediately. The patient was left for two days on the operating table in order to avoid undue risk of peritoneal infection, and he made a good recovery. In the subsequent discussion, Mr. C. B. Keetley "suggested that when it was necessary to empty the cæcum at once, the vermiform appendix might be made use of as a spout."

This appears to be the first recorded suggestion for appendicostomy, and was further elaborated in a valuable paper by Mr. Keetley [1] in 1905. In the interval the operation was actually accomplished and first described in 1902 by Dr. Robert F. Weir [2], of New York, under the following title: "A New Use for the Useless Appendix in the Surgical Treatment of Obstinate Colitis." The following account of his case is taken from Moynihan's "Abdominal Operations," Vol. II.

"A young man, aged 31, had had for nearly three years persistent diarrhoea, associated lately with the passage of blood. An exploratory incision above the umbilicus showed thickening and congestion of the colon. It was then determined to resort to a cæcal fistula, and the usual incision with intermuscular separation was made. As the cæcum was exposed the appendix rose so suggestively into view, that I determined to

employ it to make the desired fistula. It was fastened to the skin and the wound closed. The tip of the appendix was opened and a No. 12 English rubber catheter passed into the cæcum. The tip was then closed by a temporary ligature. Three days later irrigation was resorted to with most satisfactory results."

Lord Moynihan states that the first appendicostomy operation in England was performed by himself on August 5, 1903, in a case of muco-membranous colitis.

Indications.

There is now, I believe, only one sound indication for appendicostomy, namely, as a means of introducing irrigating or medicating fluids into the cæcum and colon. The two conditions for which this may be required are :—

- (1) Certain severe cases of ulcerative colitis.
- (2) Certain cases of polyposis of the colon.

In ulcerative colitis the operation is particularly indicated in those acute cases in which a severe degree of *spasm* is present in the iliac and pelvic colon, which prevents efficient treatment being carried out per rectum ; this indication will be further elaborated later. In polyposis an appendicostomy may well be considered in those cases in which the patient is greatly troubled with diarrhoea and rectal discharge ; hazeline washouts through an appendicostomy will certainly improve these symptoms and may possibly have some influence in reducing bowel irritation and postponing the development of adenocarcinoma.

A good appendicostomy will serve the following purposes :—

- (1) The introduction of water, chlorides and glucose into the large bowel, which is often valuable in dehydrated and toxic cases.
- (2) The introduction of warm vegetable oil, such as olive oil, to act as a surface emollient to the inflamed mucosa of the large bowel.
- (3) Gentle irrigation of the entire large intestine with any alkaline, antiseptic, or astringent solution that may be considered most suitable for any particular case.

The following further indications for appendicostomy have been described in past years, and are now to be considered obsolete :—

- (a) For the introduction of fluids or cathartics into the cæcum in cases of severe constipation.
- (b) In cases of megacolon appendicostomy has certainly proved helpful in the past, but has now been superseded by lumbar sympathectomy.
- (c) For the administration of fluids in certain cases of carcinoma of the stomach. For such an indication a jejunostomy would now be considered preferable.
- (d) For temporary drainage and fixation in some cases of ileocæcal intussusception after operative reduction. The usual finding in my experience of these cases is that on reduction of the intussusception the appendix is found to be somewhat swollen and congested, so that an appendicectomy is preferable to appendicostomy.
- (e) For drainage and fixation of the cæcum in volvulus of the cæcum after reduction.
- (f) For the relief of intestinal distention due to obstruction of the large bowel.
- (g) As a prophylactic measure after resection and suture of the large intestine.

For the last three of these indications (e, f, g), as a method of "decompressing the

cæcum," appendicostomy has been superseded by valvular cæcostomy, which gives more satisfactory drainage.

Technique of Appendicostomy.

The operation can be performed under general anæsthesia, or, if the patient is in a poor and toxic state of health, it can readily be carried out under local infiltration of the abdominal wall with novocain.

The *incision* is the usual muscle-splitting incision in the right iliac region. The appendix is found and is carefully examined to see if it promises to have an adequate lumen. If the appendix is small and fibrosed, it is useless for an appendicostomy ; it is preferable to remove it and to perform a valvular cæcostomy with a flanged rubber tube. If, however, the appendix is a reasonably large one and palpation clearly reveals it as having a lumen, containing air or fæcal contents, it will undoubtedly serve the purpose well. It is accordingly brought out through the incision, care being taken not to

FIG. 1.—Showing appendix brought out through a gridiron incision. The cæcum is fixed by a stitch to the parietal peritoneum.

FIG. 2.—The operation completed by stitching tip of meso-appendix to the abdominal wall and insertion of dressing beneath appendix.

damage its artery of supply in the meso-appendix. Avascular adhesions may be cautiously divided with scissors as requisite in order to mobilize the appendix, but the actual meso-appendix should not be ligated or divided at this stage. The cæcum at the base of the appendix is sutured to the parietal peritoneum in order to keep the bowel snugly up against the anterior abdominal wall (fig. 1), and the abdomen is closed in layers in the usual fashion. The only special precaution that need be noted is to see that the appendix is not compressed by contraction of the external oblique, and it is often advisable to make a short incision with scissors across the fibres of the external oblique on each side where it abuts against the appendix. The skin is closed with

interrupted sutures. The appendix is turned across the abdominal wall towards the umbilicus and is fixed to the skin by a separate stitch, which is passed through the tip of the meso-appendix. A piece of gauze soaked in sterile paraffin is passed underneath the appendix as it lies on the surface of the abdomen (fig. 2.)

Opening the Appendix.

The appendix is inspected from day to day to see that it keeps red and well nourished. Opening the appendix should be delayed, if possible, for five to seven days after the operation. The appendix is then cut across transversely with a cautery, leaving a stump about one inch in length. A catgut ligature is tied round the meso-appendix at the same level, and the excess of the appendix is removed. A tapered rubber catheter can now be passed into the cæcum whenever required, and treatment can be begun. It is usually found that a catheter of No. 8 or 10 gauge is sufficiently large to enable oil or irrigating fluid to be run in reasonably fast.

Management.

In cases of very acute ulcerative colitis, saline solution may be run into the bowel every four hours, or sometimes as a continuous slow drip to make good the loss in body fluids. In the less acute case, an appendicostomy should be regarded as an adjunct to the recognized general measures such as warmth, serum, fluid or non-residue diet, and good nursing. The following suggestions may be given as to the way in which an appendicostomy may be utilized :—

Evening.—The catheter is passed and 5 to 10 oz. of warm olive oil, or a 5 per cent. suspension of bismuth subgallate in olive oil, is run into the cæcum. The patient is asked to rest quietly and endeavour to retain the oil for as long as possible; this is usually for a period varying from a few hours until the morning.

Morning.—A colonic wash-out is given through the appendicostomy; the object of this is gently to remove stale blood, sloughs and irritating muco-purulent discharge which are occupying the entire length of the large bowel. The solution which in my experience best fulfils the purpose is the following :—

PULV. SOD. CHLOR. CO.

R	Sod. Chloride	} of each equal parts.
	Sod. Bicarbonate	
	Sod. Biborate	

Sig.—For use dissolve two teaspoonfuls in a pint of warm water.

One or two pints of this solution are run through the appendicostomy catheter. The patient either passes it *per rectum* at intervals, or a rectal tube may be inserted which allows the fluid to escape as soon as it reaches the rectum.

The *advantages* of the operation are that it is a simple and relatively minor one, and permits valuable treatment to be carried out without distressing the patient. Apart from a slight moisture from the exposed mucous membrane of the appendix, there is no faecal leakage, such as generally occurs at times from a valvular cæcostomy, and when the patient is convalescent irrigation through the appendix can readily be done by himself without trained assistance. No special belt is needed, and for dressing a piece of gauze may be placed over the appendicostomy and fixed to the patient's vest by means of a safety-pin.

Closure of the appendicostomy can be effected by a minor operation under local anæsthesia, or it often takes place spontaneously when treatment through it has been discontinued for some length of time. A safe rule, however, is not to allow closure to occur until the patient is quite fit, bowel function normal, and no sign of ulceration is visible on sigmoidoscopy. I have known a number of patients who have been so satisfied with their appendicostomy, and with the opening patent have experienced a sense of security in case their symptoms should recur, that they have indefinitely postponed its closure.

Illustrative Case.

A very severe case of ulcerative colitis has recently been in the Royal Northern Hospital under my care. The patient was a woman aged 41; she was a thin subject in a feeble condition, with a pulse rate of 120, and an irregular temperature ranging up to 103° F. Sigmoidoscopy showed a very severe degree of ulceration to be present, the mucous membrane being acutely inflamed, friable and bleeding easily; a profuse amount of blood-stained purulent discharge was present in the rectum. Her abdomen showed a general distension, especially marked over the cæcum; the pelvic colon was palpable and contracted.

On the twelfth day after admission, as she was obviously going downhill, I performed an appendicostomy under local anæsthesia in the manner described above. Seven days later the appendix was opened and treatment through it (oil instillations and alkaline wash-outs) was begun. At this time her bowels were opened about six times daily, the stools being loose and offensive, and many of them containing sloughs.

A gradual improvement set in: blood disappeared from the stools, the tongue cleaned up, and she retained the oil well at night; the motions became formed. About two months after admission, however, a relapse occurred. A profuse amount of pus was discharged from the rectum and a recto-vaginal fistula developed. The patient was now in a very low, toxic state, with a thin rapid pulse and a high fever. It seemed likely that a septicæmia was present and I decided to try intravenous injections of mercurochrome. Five injections of 10 c.c. of 0.4 per cent. mercurochrome were given on alternate days and the dramatic change for the better which took place is shown in the accompanying charts: the temperature fell to normal after the second intravenous injection of mercurochrome, the patient has progressively put on weight and is now (March, 1933) convalescent. Sigmoidoscopy shows a pale, smooth mucosa free from ulceration, with soft formed fæces present in the rectum. The recto-vaginal fistula just above the external sphincter ani is still present, but is not troubling her. The oil instillations per appendicostomy have been continued up till now, and the wash-outs have been done with the alkaline solution varied with a 1 in 4,000 mercurochrome solution (prepared by adding 1 dr. of 1 in 25 solution to 1 pint of warm water). This treatment will now gradually be discontinued.

In this case, I do not claim that the appendicostomy alone has "done the trick"; it has only been one item in a long and arduous struggle, but I believe it has materially helped towards the favourable end-result, first in keeping the patient alive by supplying fluid and controlling the acute loss of blood that was occurring from the colon, and later in assisting removal of sloughs and discharge. My experience is that appendicostomy is particularly indicated in *thin* subjects who are rapidly going downhill with ulcerative colitis. In stout subjects the appendix is not so likely to be of sufficient length to reach

SIX WEEKS' TEMPERATURE CHART OF CASE OF ULCERATIVE COLITIS DESCRIBED IN THE TEXT, TREATED BY APPENDICOSTOMY AND LATER BY INTRAVENOUS INJECTIONS OF MERCUCROCHROME. NOTE THE FALL IN TEMPERATURE AND PULSE-RATE, AND THE GRADUAL REDUCTION IN THE DAILY NUMBER OF STOOLS.

the surface readily, and to enable a satisfactory appendicostomy to be made. Thin subjects, however, seem to show improvement very soon after the vegetable oil instillations and alkaline wash-outs are begun, especially if there are the usual signs of severe toxæmia, and if abdominal examination reveals a tender, contracted condition of the iliac and pelvic colon.

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THE CHOICE OF ANÆSTHETIC IN RECTAL SURGERY.

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THE majority of operations for disorders of the rectum are confined strictly to the perineum. This is advantageous to the anæsthetist for two reasons. Firstly, if a general anæsthetic is decided upon, the administrations of the anæsthetist are far removed from those of the surgeon and each can work freely without getting in the other's way. Secondly, if a local or regional anæsthetic is preferred, the anæsthetist is dealing with a part of the body well adapted for this type of anæsthesia. The merits of each variety will now be considered.

General Anæsthetics.

The requirements of a general anæsthetic administered for cases of hæmorrhoids, fistulæ, fissures, &c., are that it should be short and deep. Depth of anæsthesia is required to relax the anal sphincter, and to avoid unconscious movement on the part of the patient which may occur when the sphincter is stretched under light anæsthesia. For the anæsthetist with limited experience ether will probably be found most satisfactory, either given on an open mask, or by means of a Clover's or similar form of inhaler. If the latter is used it will often be found that the 2 oz. placed initially in the inhaler will suffice both for induction and for the maintenance of anæsthesia during the operation. There is also the added advantage that if the patient is at all light at the start it is much easier to increase the depth of anæsthesia with a closed inhaler than with an open mask.

If gas and oxygen is used it will usually be found advantageous to employ some ether in addition, though the amount necessary will naturally vary with the patient. If suitable pre-anæsthetic medication is given, however, gas and oxygen can be a perfectly satisfactory anæsthetic without the addition of any ether at all, the only drawback being the necessity for a somewhat elaborate piece of apparatus.

Chloroform is widely condemned for rectal operations. Stretching of the anal sphincter may cause cardiac inhibition through the vagus, especially under light anæsthesia, which is most undesirable in the presence of chloroform.

Local Anæsthetics.

Under this heading are included both local and regional forms of anæsthesia. They are of three types: (a) Local infiltration; (b) extrathecal nerve block; and (c) intrathecal nerve block.